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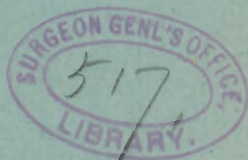
JACOB TESCHNER, M.D.

NEW YORK

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*Reprinted from the MEDICAL RECORD, December 16, 1893*

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# Observations on the Rotary-Lateral Curvature of the Spine, with Special Reference to Etiology and Treatment

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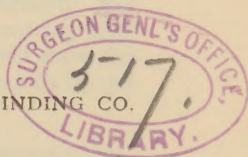
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## OBSERVATIONS ON THE ROTARY-LATERAL CURVATURE OF THE SPINE, WITH SPECIAL REFERENCE TO ETIOLOGY AND TREATMENT.<sup>1</sup>

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THE subject of rotary-lateral curvature of the spine is one upon which there has been much written, concerning the etiology, pathology, and treatment, and upon which there has been considerable discussion. This would in a measure indicate the usually unsatisfactory or only partially satisfactory results that are derived from the treatment of these cases, and the importance of giving them proper and early attention.

I shall not, in this paper, attempt to enumerate all the ideas and views of the etiology and treatment of this condition as presented by the leading orthopedists of this country and Europe, but I shall, as briefly as possible, classify the causes which are generally accepted, and give the results of my observations, laying the greatest stress upon the most important and the most frequent causes, and submit the treatment which I have found successful.

Rotary lateral curvature occurs most frequently, according to several observers, between the seventh and fourteenth years, only a small percentage occurring after the eighteenth year. The following figures will show the percentages occurring during the different periods in one thousand cases of Eulenberg, viz :

<sup>1</sup> Read at the Pan-American Medical Congress, September 5, 1893. Section in Surgery.



Years.	Per cent.
Until two.....	0.5
Two to three .....	2.1
Three to four.....	0.9
Four to five .....	1.0
Five to six .....	3.3
Six to seven .....	21.6
Seven to ten .....	56.4
Ten to fourteen.....	10.0
Fourteen to twenty.....	2.8

Girls are more prone to this disease than boys. Why this should be has not been definitely determined, but there is little doubt that the differences in the rapidity of growth and development during the earlier years, the organization of the nervous systems, the conditions favoring or opposing muscular development, and the habits of the sexes after school hours, are important elements in determining this fact.

I will pass over the pathological and anatomical causes, viz. : Pleurisy with adhesions, empyema, paralyses from different causes, rachitis, Pott's disease of the spine, inequalities of the length of extremities, and loss of an extremity, and consider only the following causes, viz. :

1. Hereditary tendency.
2. General temperament and the condition of the mind and nervous system.
3. Lack of development of the muscular system, and the general physical condition.
4. Habitual faulty position with superimposed weight.

**1. Hereditary Tendency.**—I have not been able to find any allusion citing this as a factor in the etiology of the disease, but I have frequently noticed slight curvatures and upon closer examination found decided scolioses in the mothers of girls brought to me for treatment.

I have at the present time four patients under treatment whose mothers have distinct scolioses, and one of these patients has four sisters, ranging from fifteen to twenty years of age, with slight curvatures.

I am of the opinion that if this condition of the

mothers of patients were more closely investigated, that "hereditary tendency" would become generally accepted as one of the causes.

**2. General Temperament, and the Condition of the Mind and Nervous Systems.**—This heading is one which is apt to give rise to considerable doubt when cited as a cause, because most observers lay all their stress upon the deformity and its mechanical treatment, and to a certain extent lose sight of the general, mental, and nervous conditions of the patients.

The general temperament of most girls afflicted with rotary-lateral curvature is apathetic, indifferent, somewhat lazy, and sometimes a trifle morose. As a rule they are backward in their studies at school, and usually show a decided disinclination to romp and play after school hours, with the same vigor and enjoyment as do their companions. The facial expression is frequently a vacant stare, the lower jaw dropping and the mouth being open, giving the patient a silly appearance. This was particularly well marked in a patient sent to me for treatment by Dr. Leonard Weber, and it became more conspicuous by its absence, as noted by Dr. Weber, after the patient had been under treatment for a short time. Of course, there are all gradations between an highly intelligent and an almost idiotic countenance, but where there is a lack of intelligent expression, the face certainly changes after energetic treatment.

Under this heading, I would also call your attention to a peculiar lack of co-ordinating power, or lack of muscular control with which some patients are possessed. It seems to some patients, until properly instructed, almost an impossibility to fully extend an entire extremity, either upper or lower. If, for example, a patient be instructed to hold an upper extremity abducted at a right angle to the body, palms down, and hold it rigid at all the joints and fully extended, the observer will find that if the wrist be extended, the elbow is apt to be flexed, or if the elbow be extended, the wrist will be flexed, or if

both the wrist and elbow be extended, the fingers will be either flexed or hyper-extended.

This lack of co-ordination or lack of muscular control can be and is made to disappear through the muscular instruction and development which forms part of the treatment. Patients usually, when told to grasp an object firmly, a cane for instance, neither properly approximate the palm to it so as to exert an even pressure upon it, nor do they encircle it with the thumb; they hold it between the thenar and hypothenar eminences of the palmar surface of the first set of phalanges, the thumb being at a right angle to the phalanges, and the palm being hollow, thereby showing their inability to exert muscular influence in a normal or proper direction.

**3. Lack of Development of the Muscular System and the General Physical Condition.**—General muscular development is frequently found to be very poor or almost wanting. In most cases the trapezii, the rhomboidei, the sterno-mastoids, and deltoids especially are found almost rudimentary. The back, chest, and abdominal muscles are generally found in worse condition than the muscles of the extremities. With this state of affairs we naturally expect and find a lolling and lounging muscular habit, and a general want of muscular tonicity and precision. Patients when suspended, are rarely able to sustain their own weight. The physical condition is as a rule not good, the patients being frequently the victims of a poor digestion accompanied by malassimilation. In girls leucorrhœa is generally present and frequently copious. In mentioning the general condition of health, I do not wish to be understood to claim that when the general system is run down, a curvature will occur, or that there are no cases of curvature in which the general health is not impaired, but I do claim that when there are tendencies to a curvature, as cited above, with the conditions as explained in the next paragraph, an impaired condition of the general health will greatly assist the rapid development of the deformity.



**4. Habitual Faulty Position with Superimposed Weight.**—Resting the weight of the body upon one foot while standing, or sitting more upon one buttock than upon the other, and in either position permitting the shoulders to fall forward, and the chin to approximate the chest, shows a relaxation of all the muscles which hold the spine erect in the normal condition, and permits a sagging of the upper portion of the body upon the lower, and twists the spine and trunk into a mild form of deformity, the mechanism of which was so ably demonstrated by Dr. A. B. Judson<sup>1</sup> at the meeting of the American Orthopedic Association, in September, 1890. This deformity passes off when a normal standing or sitting position is assumed; but when such temporary deformity occurs not only daily, but several times a day, and for protracted periods, it gradually increases and later becomes permanent and fixed, and produces the actual bony and ligamentous changes which are met with in cases of long standing.

The faulty sitting position is more frequent than the standing, as children as a rule spend about five hours in the twenty-four, sitting in school. I will therefore call your attention to the school habits of children, while sitting, and their shifting of positions to relieve the tiring of the strained groups of muscles.

Dr. A. Baginsky<sup>2</sup> in his admirable paper read before the "German Society for the Care of Public Health" at Berlin, in March, 1888, says: "More and more are surgeons convinced through their anatomical and physiological investigations and from their practical observations, that scolioses, the most important of all deformities of the spine, in a very large majority of cases owe their origin to the influence of school life upon the organism of the child."

<sup>1</sup> The Rotary Element in Lateral Curvature of the Spine. A. B. Judson, M.D., N. Y. Trans-American Orthopedic Association. Vol. iii., 1890.

<sup>2</sup> Ueber Rückgrads-verkrümmungen der Schulkinder, Deutsche Medical Zeitung, Berlin, 1888, ix., pp. 529-541.

This writer further shows that if we observe a class of children during the early portion of school hours, more particularly if the subject of the lesson be interesting and the weather cool, they will all sit quite erect, with their heads well poised, their chests brought forward, their feet evenly placed upon the floor (if the lower extremities are not too short to reach it), and the frontal plane of their bodies parallel to the edges of the desks in front of them. Later on, one by one, the children will permit the shoulders to drop and fall forward, the chins to approximate their chests, thereby changing the entire contours of their spines.

There is a tendency to turn the trunk to the right or left, in order to relieve one buttock of the weight of the superimposed body. Some are apt to cross the thighs, thereby producing the same effect. The frontal planes of the bodies of the children are then no longer found to be parallel to the edges of their desks.

Dr. Baginsky shows even worse positions which are assumed by children during their writing lessons, when the frontal planes of their bodies are placed at right angles to their desks.

Any change of position, no matter how slight, changes the centre of gravity, and those muscles which hold the body upright are strained as soon as the position recedes from the erect one. When one set of muscles is thoroughly tired, the child changes position to relieve the strained set of muscles, and brings those muscles which have not been taxed into play.

When children become habituated to faulty positions in sitting, they are apt to, and do, assume analogous faulty positions while standing, and when these faulty positions have been maintained for a while, decided scoliotic attitudes are seen, and, as I have stated before, even though they be temporary, they become habitual, and lay the foundation for well-marked deformities.

Before taking up the treatment of scoliosis, I do not think it amiss to call general attention to the pernicious

effect of long and continued school hours, without intermission for play or calisthenics, and also the improper furnishing of school houses with benches, chairs, and desks of a regulation size, without regard to the varying sizes of the pupils, and consequently without any regard for their comfort and well being. Sitting at best is tiresome, not only to children, but to everyone.

*Treatment.*—In every case of rotary-lateral curvature, from the mildest case to the one which appears beyond redemption, the first efforts should be directed to the prompt removal of the causes, apparent or real, of the deformity. Any shortcoming of the extremities from paralysis, inequalities, or deformities, as well as disturbances of vision, should be corrected. The child should at once be prohibited from attending school, thereby eliminating the most persistent and potent cause. The general condition of health should be carefully attended to, by the correction of any disturbances of digestion or assimilation, by frequent baths to improve the condition of the skin, by the administration of tonics, if found necessary, to improve the nervous and muscular systems, and by sufficient open-air exercise. The patient should have a properly constructed chair to sit upon; the seat of the chair should incline downward from before backward, the inclination forming an angle of about eight degrees with a line parallel to the floor upon which the chair rests. The back of the chair should be properly shaped to receive the back of the patient, and it should extend at a right angle to the seat, up to the shoulders of the patient; the seat of the chair should be at such a height that the patient can rest the feet comfortably upon the floor. In a chair of this description, the patient assumes a slightly reclining position, thereby relieving all muscular strain.

The patient should be instructed to rest frequently for from five to fifteen minutes at a time by lying supine upon the floor, the lower extremities fully extended, and the upper extremities also fully extended above the head.

Self-suspension by means of a Sayre apparatus twice a day should be advised, and the patient should be instructed in exercises while suspended from an horizontal bar or from rings.

I shall now consider the various degrees of scoliosis, with reference to the treatment of each degree.

1. Habitual scolioses which can be obliterated by the voluntary muscular efforts of the patients.

2. Scolioses which are not affected by muscular efforts, but which can be reduced or obliterated by suspension of the patients.

3. Scolioses which are not affected by muscular efforts, or by suspension, the deformities being fixed.

In all three forms of scoliosis nothing is of greater importance than proper, thorough, and regular gymnastic exercises, which will equally develop the entire muscular system. Various kinds of exercises have been advocated by different writers and excellent results have been claimed by them.

I wish especially to call your attention to that excellent paper of Dr. Reginald Sayre,<sup>1</sup> in which he minutely describes the gymnastic exercises which patients should be taught. These exercises, with slight variations, according to the requirements of individual cases, are the ones I use in cases which come to me for treatment.

**1. Habitual Scolioses which can be Obliterated by the Voluntary Muscular Efforts of the Patients.**—In these cases I place my entire dependence for good results upon the general directions before described, and systematic and regular gymnastic exercises. I neither consider it necessary nor wise to give support to the patient by means of any apparatus or even a corset, but I prefer to leave the muscles which are being developed and strengthened by exercises, entirely unrestrained and free.

**2. Scolioses which are not Affected by Voluntary Muscular Efforts, but which can be Reduced or Obliterated by Suspension of the Patients.**—In this class of

<sup>1</sup> New York Medical Journal, 1888, vol. xlviii., pp. 533-538.



cases I adopt the same course and plan of treatment as in the first class of cases, but in addition I find it necessary and beneficial to apply well-fitting, light, and well cemented plaster of Paris corsets, while the patients are suspended in a Sayre apparatus, and to permit the patients to wear them, if the deformities are obliterated when the first corsets are applied, until they have improved sufficiently to enable them to correct their deformities through their own muscular efforts. They are then treated as patients of the first class. In those cases in which the deformities are only reduced but not obliterated by suspension, as the patients improve under treatment new corsets are applied from time to time, until at last the deformities can be entirely obliterated by suspension. These also become patients of the first class.

**3. Scolioses which are not Affected by Voluntary Muscular Efforts, or by Suspension, the Deformities being Fixed.**—The treatment of this class is the same as that in the foregoing class, but other means must be resorted to to reduce the fixed deformities of the ribs and spine. I have found the forcible daily twisting of the spine and compression of the ribs, of considerable value in reducing the fixed deformities, and I have within the past two weeks begun the use of an apparatus used by Dr. Albert Hoffa, of Wurzburg. This apparatus is described in the *Zeitschrift für Orthopædischer Chirurgie*, 1891. Although I am not in a position to claim any results or benefit from the use of the apparatus, I judge from appearances and from the combined effect of suspension, fixation of the pelvis, twisting of the spine, and pressure upon the scoliotic eminence, that it will prove to be a powerful adjunct to the more successful treatment of old cases of fixed scolioses.

It will give me great pleasure to report the results of cases treated in this manner, whether successful or otherwise.





